



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,808	01/27/2004	Huang-Ming Chen	N1085-00256 [TSMC2003-08]	2454
54657	7590	01/10/2008	EXAMINER	
DUANE MORRIS LLP IP DEPARTMENT (TSMC) 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103-4196			MOORE, KARLA A	
			ART UNIT	PAPER NUMBER
			1792	
			MAIL DATE	DELIVERY MODE
			01/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/765,808	Applicant(s) CHEN ET AL.	
	Examiner Karla Moore	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 29-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-7, 9-12 and 29-32 is/are allowed.
- 6) ☒ Claim(s) 8 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,489,249 to Mathad et al. in view of Japanese Patent No. 2000208492 A to Yamashita.

5. Mathad et al. disclose a plasma etching apparatus (Figure 3) substantially as claimed and comprising a chuck for retaining a substrate and a focus ring set, said focus ring set including an upper focus ring (31) that laterally surrounds said chuck and a lower focus ring (30) disposed completely below said upper focus ring and directly underneath said substrate.

6. However, Mathad et al. do not explicitly teach that the oxygen is impregnated in the material of the focus ring.

7. Yamashita discloses the use of a focus ring formed of a material than includes oxygen impregnated therein (i.e. existing in quartz) for the purpose of preventing the in-plane uniformity of a semiconductor wafer from being damaged (abstract).

8. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a focus ring formed of a material that includes oxygen impregnated (existing therein) in Mathad et al. in order to prevent the in-plane uniformity of a semiconductor wafer from being damaged as taught by Yamashita.

9. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,489,249 to Mathad et al. in view of Japanese Patent No. 2000208492 A to Yamashita and Japanese Patent No. 2002016126 to Nagaiwa et al.

10. Mathad et al. disclose a plasma etching apparatus (Figure 3) substantially as claimed and comprising a chuck for retaining a substrate and a focus ring set, said focus ring set including an upper focus ring (31) that laterally surrounds said chuck and a lower focus ring (30) disposed completely below said upper focus ring and directly underneath said substrate.

11. However, Mathad et al. do not explicitly teach that the oxygen is impregnated in the material of the focus ring.

12. Yamashita discloses the use of a focus ring formed of a material than includes oxygen impregnated therein (i.e. existing in quartz) for the purpose of preventing the in-plane uniformity of a semiconductor wafer from being damaged (abstract).

13. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a focus ring formed of a material that includes oxygen impregnated (existing therein) in Mathad et al. in order to prevent the in-plane uniformity of a semiconductor wafer from being damaged as taught by Yamashita.

14. Mathad et al. and Yamashita disclose the invention substantially as claimed and as described above.

15. However, Mathad et al. and Yamashita fail to teach said focus ring is maintainable at a temperature not greater than a temperature of said substrate while and etching operation is carrier out upon said substrate.

16. Nagaiwa et al. disclose a plasma etching apparatus in Figures 1 and 2 comprising: a focus ring (12); and a chuck (11) for retaining a substrate, said focus ring capable of being maintained at a temperature no greater than a temperature of said substrate while and etching operation is carried out for the purpose of preventing deteriorated etching characteristics due to the influence of temperature. Also see abstract and paragraphs 24 and 25 of JPO online translation.

17. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided said focus ring capable of being maintained at a temperature no greater than a temperature of said substrate while and etching operation is

carried out in Mathad et al. and Yamashita in order to prevent deteriorated etching characteristics due to the influence of temperature as taught by Nagaiwa et al.

Allowable Subject Matter

18. Claims 1-7, 9-12 and 29-32 are allowed.

19. The following is an examiner's statement of reasons for allowance: The prior art of record fails to teach or fairly suggest a plasma etching apparatus comprising a chuck for retaining a substrate and a focus ring peripherally surrounding said chuck formed of a focus ring material that includes oxygen throughout the focus ring material, such that said oxygen is released when an etching operation is carried out, wherein at least a portion of said focus ring substantially continuously extends directly underneath a peripheral portion of said chuck. Further, no other prior art was located which taught or fairly suggested the claimed apparatus in whole or in part, along with the requisite motivations for combination

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

20. Applicant's arguments and amendments, with respect to claims 1-7, 9-12 and 29-32 have been fully considered and are persuasive. The previous rejections have been withdrawn.

21. Applicant's arguments with respect to claims 8 and 33 have been considered but are moot in view of the new ground(s) of rejection. Mathad et al. discloses the claimed invention, as

amended (e.g. a lower focus ring disposed completely below said upper focus ring and directly underneath said substrate).

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:
10/765,808
Art Unit: 1792

Page 7

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KARLA MOORE
PRIMARY EXAMINER

7 January 2008